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(54) **OPERATION COMMUNICATION SYSTEM**

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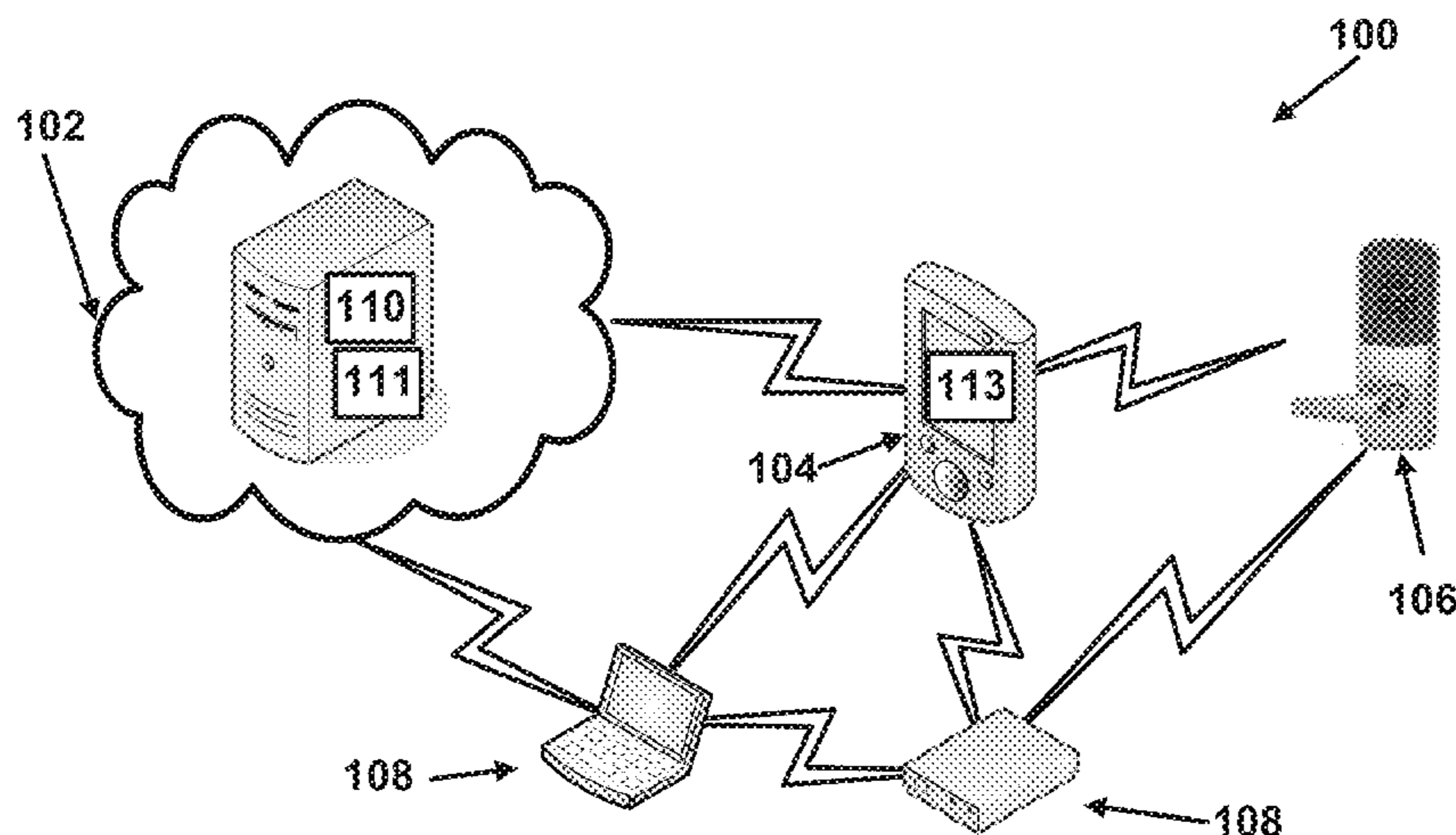
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(57) **ABSTRACT**

An operation communication system is provided including a server, a mobile device, and a reader device. The server and the reader device communicate data with one another via the mobile device. The mobile device may communicate with the reader device via Bluetooth, for example. The mobile device may communicate with the server via the Internet, for example. Associated methods, devices and apparatuses are also provided.

**20 Claims, 4 Drawing Sheets**



**Related U.S. Application Data**

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FIG. 1

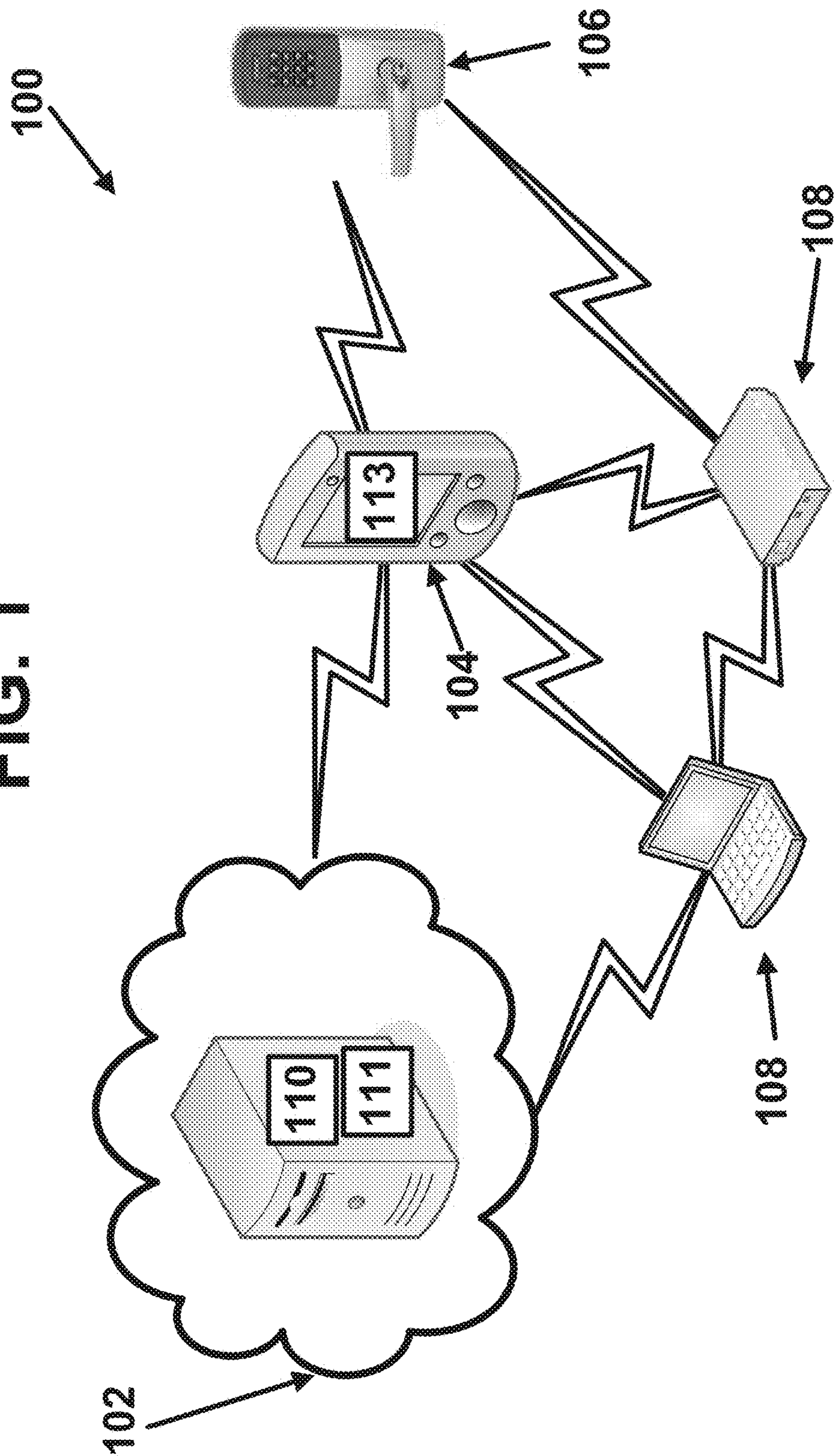
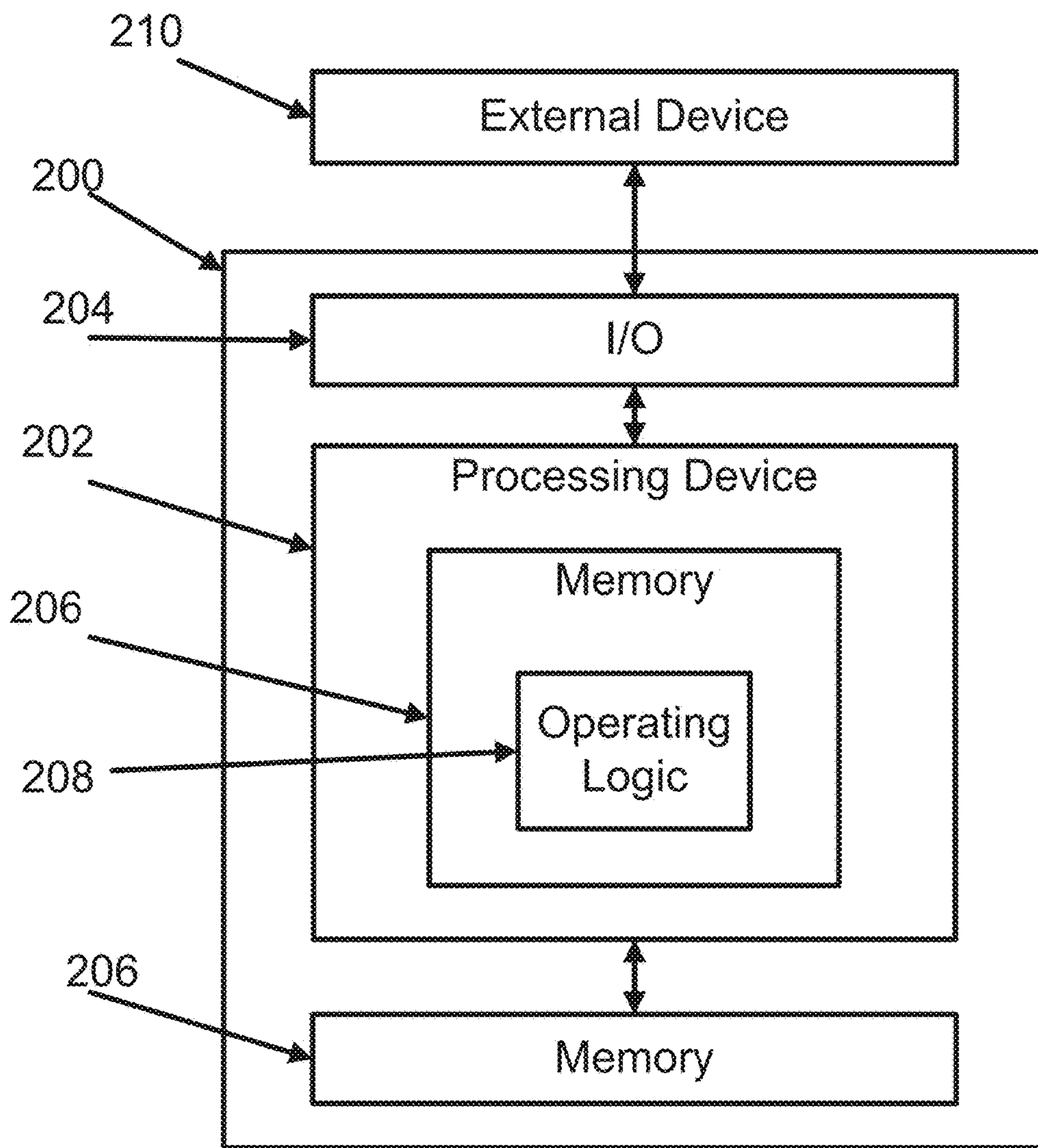
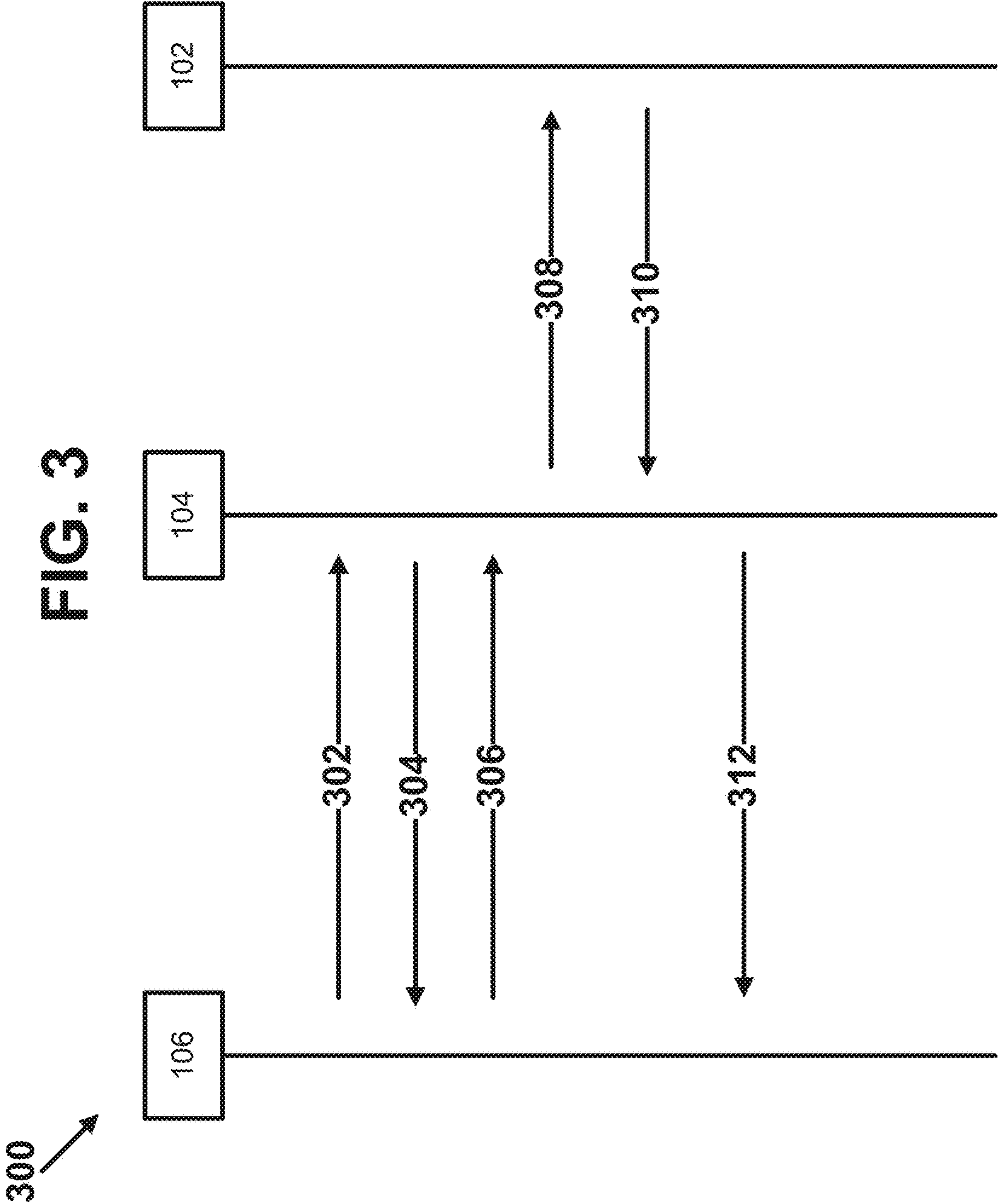
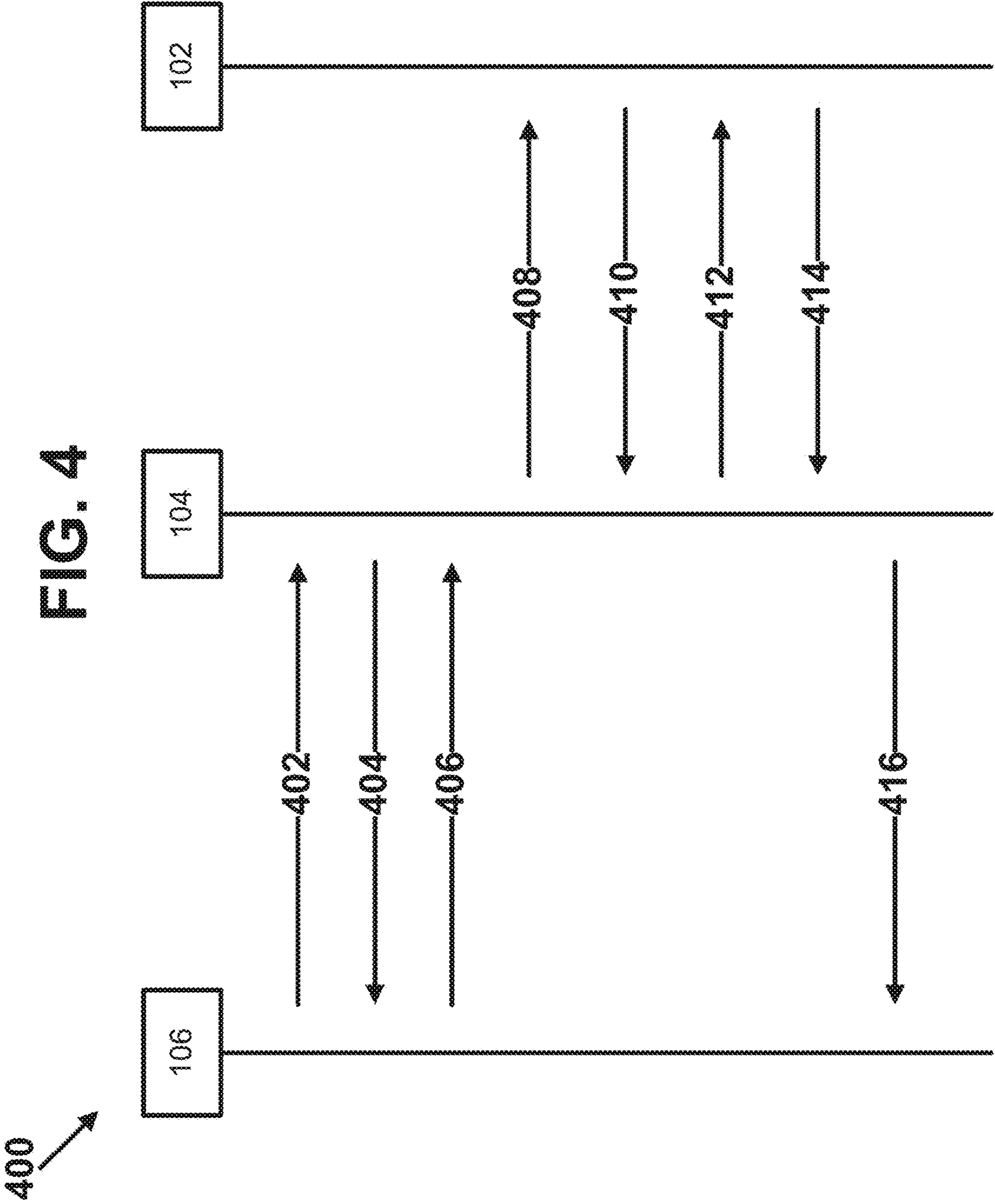


FIG. 2









**OPERATION COMMUNICATION SYSTEM****CROSS-REFERENCE TO RELATED APPLICATIONS**

The present application is a continuation of U.S. Patent Application No. 13/969,403 filed Aug. 16, 2013, which claims the benefit of U.S. Provisional Patent Application No. 61/684,114 filed Aug. 16, 2012 and U.S. Provisional Patent Application No. 61/684,097 filed Aug. 16, 2012, the contents of each application are incorporated herein by reference in their entirety.

**BACKGROUND**

Various systems may be employed for providing information to a server or to a reader device. Some existing systems have shortcomings relative to certain applications. Accordingly, there remains a need for further contributions in this area of technology.

**SUMMARY**

One embodiment of the present application is a unique communication system. Other embodiments include apparatuses, systems, devices, hardware, methods, and combinations for communicating. Further embodiments, forms, features, aspects, benefits, and advantages of the present application shall become apparent from the description and figures provided herewith.

**BRIEF DESCRIPTION OF THE FIGURES**

The description herein makes reference to the accompanying figures wherein like reference numerals refer to like parts throughout the several views, and wherein:

FIG. 1 is a schematic block diagram of an exemplary system:

FIG. 2 is a schematic block diagram of an exemplary computing device.

FIG. 3 is a schematic time sequence diagram for an exemplary process.

FIG. 4 is a schematic time sequence diagram for another exemplary process.

**DETAILED DESCRIPTION OF REPRESENTATIVE EMBODIMENTS**

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation on the scope of the invention is hereby intended. Any alterations and further modifications in the described embodiments, and any further applications of the principles of the invention as described herein are contemplated as would normally occur to one skilled in the art to which the invention relates.

FIG. 1 illustrates an exemplary system 100. In the embodiment shown in FIG. 1, the system 100 is an access control system. It is contemplated that in other embodiments, the system 100 may be a payment system, transit system, or any other system that utilizes a credential or a unique identifier. The system 100 includes a server 102, a mobile device 104, a reader device 106, and one or more wireless devices 108. The server 102 may provide a credential management service which, in the illustrated embodi-

ment, includes a cloud application 110. The credential management service, via the cloud application 110, may generally maintain and host a database 111 of user configuration information., credentials, statuses, device configurations for user interfaces, updates, key management, credential management, tracking, notifications, access control information, alarm information and/or audit history information for assets. It is contemplated that the type of data stored in the database 111 may vary depending on the type of system (e.g., access control system, payment system, transit system, etc.). The server 102 may include multiple servers. Additionally, the server 110 may communicate with the mobile device 104 and/or the wireless device 108 via an Internet connection.

In the embodiment shown in FIG. 1, the mobile device 104 is a mobile phone such as, for example, a cell phone or smart phone. It is contemplated that in other embodiments, the mobile device 104 may be a tablet computer, a smart-card, or any other mobile computing device that can store data and communicate with the reader device 106. It is contemplated that the wireless devices 108 may be any type of computing device such as, for example, a desktop computer, a laptop computer, a tablet computer, a fob, an IP-to-Bluetooth smart bridge, and/or any other computing device having wireless communication capabilities. In the embodiment shown in FIG. 1, the reader device 106 is an electronic lock that is configured to communicate with the mobile device 104, one or more of the wireless devices 108, and the server 102 (via the mobile device 104). However, it is contemplated that in other embodiments, the reader device 106 may be any other type of device configured to receive and/or process credential information or a unique identifier. Other types of suitable reader devices 106 are also contemplated as would occur to those skilled in the art.

The mobile device 104 may include a Bluetooth transceiver configured to communicate with a Bluetooth transceiver that is part of the reader device 106. As used herein, the term Bluetooth includes Bluetooth Low Energy (BLE). It is contemplated that the mobile device 104 and the reader device 106 may communicate via a protocol other than Bluetooth such as, for example, near field communication (NFC) or any other appropriate communication protocol. The mobile device 104 also includes software and/or hardware such that the mobile phone 104 may communicate with the server 102 over the Internet, for example.

A user may generate user interface configurations for the reader device 106 by utilizing an application 113 on the mobile device 104. Additionally or alternatively, the user interface configurations may be selected and downloaded by the mobile device 104 from the server 102 via, for example, the cloud application 110. The mobile device 104 may communicate the user interface configurations to the reader device 106 based on selections made by the user. The reader device 106 may include software and/or hardware to receive and implement the user interface configurations from the mobile device 104.

The wireless devices 108 also include software and/or hardware such that the wireless devices 108 can communicate information wirelessly with the mobile device 104, the reader device 106, and/or other wireless devices 108 using, for example, Bluetooth. At least one wireless device 108, such as a bridge, may have a wired connection to the server 102 for communicating with the server 102 over the Internet, for example. The wireless devices 108 are also capable of receiving configuration changes via their user interfaces.

In the present application, the configuration of the user interface (UI) of the reader device 106 may be personalized



by the individual user rather than the UI being set to a common, population-wide set of characteristics. A user may personalize their UI experience through a combination of server **102** and/or mobile device **104** based services. Moreover, a credential user may personalize their experience with a reader device **106** while maintaining and/or adhering to the system administration rules and security. Additionally, an administrator of the system **100** may also be able to uniquely customize the UI of the reader devices **106** in the system **100**.

In the present application, configuration options may be allowed and/or disallowed by a cloud based access control services (ACS) center on the server **102** as a "Policy". The configuration of user options may be stored on the mobile device **104**. For example, a reader device **106** on a door (or another type of access restriction structure or device) may be set to unlock immediately so that input from a user is minimal, as in the case, for example, when a user's hands and/or arms are full of groceries so that the user can gain entrance with ease as they approach a particular door.

Configuration policy settings may be unique to the user and/or unique for each of the reader devices **106** on doors to which they may have access. In enterprise environments, Policy on Cloud may allow single sign-on in harmony with Windows and Active Directory, as well as other enterprise user login services. The server **102** may implement a Policy on Cloud based control of the cache mode on the reader device **106** in which configurations may be pushed to a reader device **106** through a mobile device **104**.

Individual user policies may be dynamically set by an administrator and/or pushed by the ACS center at the server **102** to the user's mobile device **104**. The user may then configure some or all of the policies or configurations received from the server **102** using the mobile device **104**.

Access to a reader device **106** may be dynamically decided by a written information security policy (WISP) stored on the mobile device **104**, in which the WISP has been previously pushed to the mobile device **104** from the server **102**. The WISP may determine what zone/building/door access rights a user has for offline zones/buildings/doors.

The mobile device **104** may determine when to store (i.e., hold) information, send information to the server **102**, and/or send information to a reader device **106** such as, for example, an electronic lock **106**. This function may be used to optimize data transfer for frequently connected reader devices **106**, and may be used to store and forward information to the reader devices **106** that are connected infrequently and/or outside the range of a "real-time" or frequent data connection to the server **102**.

The user configuration options for a non-online credential **108** such as, for example, a wireless fob, may be managed by a compatible personal computer **108** if there is no ACS on the server **102**, or by some other compatible communicating device such as, for example, an IP to wireless bridge **108** that is connected to the ACS in the server **102**.

Manual programming of offline locks may be accomplished by the user via their mobile device **104**. The user interface is used as a master programming credential/master programming device for the reader devices **106** such as, for example, residential electronic locks.

Americans with Disability Act settings may be configured by the user. As should be appreciated, disabled individuals may have varying levels of ability. Thus, options may be provided for a disabled user to select their comfort/challenge level for interacting with the reader device **106** and a user interface device such as, for example, a fob, a mobile device **104**, and/or another wireless device **108**.

A user may choose to use gestures in association with the mobile devices **104** and/or fobs that support gesture control. Gestures may vary from a simple strong tap on the device's housing to a more complex gesture such as, for example, rotating the device to emulate turning a door handle to be used as a verification to unlock the door. Custom user defined gestures may also be allowed to perform verification tasks. Custom user defined gestures may be created using the applications **113** on the mobile device **104**.

FIG. **2** is a schematic block diagram of a computing device **200**. The computing device **200** is one example of a server, a mobile device, a reader device and/or a wireless device configuration that may be utilized in connection with the server **102**, the mobile device **104**, the reader device **106**, and/or the wireless devices **108** shown in FIG. **1**. The computing device **200** includes a processing device **202**, an input/output device **204**, memory **206**, and operating logic **208**. Furthermore, computing device **200** communicates with one or more external devices **210**.

The input/output device **204** allows the computing device **200** to communicate with the external device **210**. For example, the input/output device **204** may be a transceiver, a network adapter, a network card, an interface, or a communication port (e.g., a USB port, serial port, parallel port, an analog port, a digital port, VGA, DVI, HDMI, Fire Wire, CAT 5, or any other type of communication port or interface). The input/output device **204** may include hardware, software, and/or firmware. It is also contemplated that the input/output device **204** may include more than one of these adapters, cards or ports.

The external device **210** may be any type of device that allows data to be inputted or outputted from the computing device **200**. For example, the external device **210** may be a mobile device, a reader device, other electronic equipment, a handheld computer, a diagnostic tool, a controller, a computer, a server, a processing system, a printer, a display, an alarm, an illuminated indicator such as a status indicator, a keyboard, a mouse, or a touch screen display. Furthermore, it is contemplated that the external device **210** may be integrated into the computing device **200**. It is further contemplated that there may be more than one external device in communication with the computing device **200**.

The processing device **202** can be a programmable type, a dedicated hardwired state machine, or any combination thereof. The processing device **202** may further include multiple processors. Arithmetic-Logic Units (ALUs), Central Processing Units (CPUs), Digital Signal Processors (DSPs), or the like. Processing devices **202** with multiple processing units may utilize distributed, pipelined, and/or parallel processing. The processing device **202** may be dedicated to the performance of just the operations described herein, or may be utilized in one or more additional applications. In the depicted form, the processing device **202** is of programmable variety that executes algorithms and processes data in accordance with operating logic **208**, as defined by programming instructions (such as software or firmware) stored in memory **206**. Alternatively or additionally, the operating logic **208** for the processing device **202** is at least partially defined by hardwired logic or other hardware. The processing device **202** may include one or more components of any type suitable to process the signals received from the input/output device **204** or elsewhere, and to provide desired output signals. Such components may include digital circuitry, analog circuitry, or a combination of both.

Memory **206** may be of one or more types, such as a solid-state variety, electromagnetic variety, optical variety,



or any combination thereof. Furthermore, memory 206 can be volatile, nonvolatile, or a combination of these types, and some or all of memory 206 can be of a portable variety, such as a disk, tape, memory stick, cartridge, or the like. Additionally, memory 206 can store data that is manipulated by the operating logic 208 of the processing device 202, such as data representative of signals received from and/or sent to input/output device 204, in addition to or in lieu of storing programming instructions defining the operating logic 208, just to name one example. As shown in FIG. 2, memory 206 may be included with the processing device 202 and/or coupled to the processing device 202.

FIG. 3 illustrates a schematic time sequence diagram for another embodiment of the present invention including an exemplary process 300 for communicating data between the server 102 and the reader device 106 via the mobile device 104. Operations illustrated for all of the processes in the present application are understood to be examples only, and operations may be combined/divided and added/removed as well as re-ordered in whole or in part, unless explicitly stated to the contrary.

Process 300 begins with operation 302 in which the reader device 106 advertises to one or more of the mobile devices 104 that the reader device 106 is available for communication or connection. The reader device 106 may advertise to the mobile devices 104 by transmitting a Bluetooth signal continuously or intermittently. Additionally, the reader device 106 may advertise, for example, while in a low power sleep state. The reader device 106 may perform such advertising, for example, once every 'x' amount of time.

Process 300 then proceeds from operation 302 to operation 304. At operation 304, the mobile device 104 scans for devices in its communication range. The mobile device 104 may scan, for example, when the mobile device 104 is in a low power scan mode. When the reader device 106 is in range, the mobile device 104 may initiate communication with the reader device 106. For example, the mobile device 104 responds to the advertisement transmitted by the reader device 106 by sending one or more response messages, which in turn initiate and/or establish a connection between the mobile device 104 and the reader device 106 via Bluetooth communication, for example.

Process 300 then proceeds from operation 304 to operation 308. At operation 306, the reader device 106 may transmit a message that includes an encrypted reader device identification (ID) to the mobile device 104 via Bluetooth communication. It is contemplated that a unique identifier other than a reader device ID may be transmitted to the mobile device 104. Furthermore, it is contemplated that the mobile device 104 reader device ID may not necessarily be encrypted when it is transmitted to the mobile device 104.

Process 300 proceeds from operation 306 to operation 308. At operation 308, the mobile device 104 may transmit a message to the server 102 that includes the encrypted reader device ID and the mobile device ID. The server 102 may decrypt the reader device ID. Additionally, the server 102 may analyze the reader device ID and/or the mobile device ID to determine whether to grant or deny permission to the mobile device 104 to perform the requested function. For example, in an access control system, the server 102 may determine whether the mobile device 104 should be granted or denied access to the area secured by the reader device 106. As another example, in a payment system, the server 102 may determine whether to grant or deny a payment by the mobile device 104. In some embodiments, the server 102 may make the grant/deny decision in real-time.

Process 300 then proceeds from operation 308 to operation 310. At operation 310, the server 102 transmits a grant/deny message to the mobile device 104. In some embodiments, the grant/deny message may be encrypted.

Process 300 then proceeds from operation 310 to operation 312. At operation 312, the mobile device 104 utilizes the grant/deny message with the reader device 106. If the message is a grant, then the mobile device 104 will be granted access by the reader device 106. Conversely, if the message is a deny, then the mobile device 104 will be denied access by the reader device 106.

FIG. 4 illustrates a schematic time sequence diagram for another embodiment of the present application including an exemplary process 400 for communicating data between the server 102 and the reader device 106 via the mobile device 104 with additional credential information. Operations illustrated for all of the processes in the present application are understood to be examples only, and operations may be combined/divided and added/removed as well as re-ordered in whole or in part, unless explicitly stated to the contrary.

Process 400 begins with operation 402 in which the reader device 106 advertises to one or more mobile devices 104 that the reader device 106 is available for communication or connection. The reader device 106 may advertise to the mobile devices 104 by transmitting a Bluetooth signal continuously or intermittently. Additionally, the reader device 106 may advertise, for example, while in a low power sleep state. The reader device 106 may perform such advertising, for example, once every 'x' amount of time.

Process 400 then proceeds from operation 402 to operation 404. At operation 404, the mobile device 104 scans for devices within its communication range. The mobile device 104 may scan, for example, when the mobile device 104 is in a low power scan mode. When the reader device 106 is in range, the mobile device 104 may initiate communication with the reader device 106. For example, the mobile device 104 responds to the advertisement transmitted by the reader device 106 by sending one or more response messages, which in turn initiate and/or establish a connection between the mobile device 104 and the reader device 106 via Bluetooth communication, for example.

Process 400 then proceeds from operation 404 to operation 406. At operation 406, the reader device 106 may transmit a message that includes an encrypted reader device identification (ID) to the mobile device 104 via Bluetooth communication. It is contemplated that a unique identifier other than a reader device ID may be transmitted to the mobile device 104. Furthermore, it is contemplated that the mobile device 104 reader device ID may not necessarily be encrypted when it is transmitted to the mobile device 104.

Process 400 proceeds from operation 406 to operation 408. At operation 408, the mobile device 104 may transmit a message to the server 102 that includes the encrypted reader device ID and the mobile device ID. The server 102 may decrypt the reader device ID. Additionally, the server 102 may analyze the reader device ID and/or the mobile device ID to determine whether to grant or deny permission to the mobile device 104 to perform the requested function. For example, in an access control system, the server 102 may determine whether the mobile device 104 should be granted or denied access to the area secured by the reader device 106. As another example, in a payment system, the server 102 may determine whether to grant or deny a payment by the mobile device 104. The server 102 may make the grant/deny decision in real-time. In this example,



the server **102** determines that additional credential information is needed to make the determination of whether to grant or deny access.

Process **400** then proceeds from operation **408** to operation **410**. At operation **410**, the server **102** transmits a message to the mobile device **104** requesting additional credential information.

Process **400** then proceeds from operation **410** to operation **412**. At operation **412**, the user of the mobile device **104** may then input the additional credential information into the mobile device **104**. This input may be different credential types including, for example, a pin code, a passphrase, a gesture with the phone, and/or facial or voice recognition to the server **102**. In another embodiment, the mobile device **104** automatically supplies the additional credential information. Once the mobile device **104** has the additional credential information, the mobile device **104** transmits the additional credential information to the server **102**.

Process **400** then proceeds from operation **412** to operation **414**. At operation **414**, the server **102** receives the additional credential information and determines whether to grant or deny the request based on the reader device ID, the mobile device ID, and/or the additional credential information. The server **102** may make the decision in real-time. The server **102** then transmits a grant/deny message to the mobile device **104**. In some embodiments, the grant/deny message may be encrypted.

Process **400** then proceeds from operation **414** to operation **416**. At operation **416**, the mobile device **104** utilizes the grant/deny message with the reader device **106**. If the message is a grant, then the mobile device **104** will be granted access by the reader device **106**. If the message is a deny, then the mobile device **104** will be denied access by the reader device **106**.

In one embodiment, the system architecture in the present application generally provides a communication pipeline between the mobile device **104** and the server **102**, which in turn allows the electronics resident on the door to have a relatively simpler and smaller form factor and design.

In another embodiment, installation of a real-time access control verification system may be performed without any wires. Furthermore, the reader device **106** may be battery powered and/or have the ability to “go online” through an Internet connection of the mobile device **104** or other wireless devices **108**. In another embodiment, the mobile device **104** provides the communication path between the reader device **106** and the server **102**, which may allow for a real-time access control decision, without a hardwired connection for the reader device **106**.

The various aspects of the process **300** and/or **400** in the present application may be implemented in the operating logic **208** as operations by software, hardware, artificial intelligence, fuzzy logic, or any combination thereof, or at least partially performed by a user or operator. In certain embodiments, operations represent software elements as a computer program encoded on a computer readable medium, wherein the server **102**, the mobile device **104**, the reader device **106**, and/or the wireless devices **108** perform the described operations when executing the computer program.

One aspect of the present application may include a system, comprising: a mobile device; and a reader device; and wherein the mobile device is configured to receive a user input to configure a personalized user interface configuration, wherein the mobile device is further configured to wirelessly transmit the personalized user interface configuration to a reader device; and wherein the reader device is

configured to receive the personalized user interface configuration from the mobile device, to implement the personalized user interface configuration, to receive additional information from the mobile device, and to perform function based upon the additional information and the personalized user interface configuration.

Features of the aspect of the present application may include: a cloud server configured to allow or disallow user interface configuration options based on a policy, wherein the mobile device is further configured to wirelessly communicate with the cloud server to receive at least one of user interface configuration options and the policy; wherein the policy is based upon identity of the mobile device; wherein the policy is based upon identity of the reader device; wherein the policy is pushed to the mobile device; a wireless device configured to communicate configuration information via Bluetooth with at least one of the mobile device and the reader device; wherein the wireless device is at least one of a fob, a computer, a reader and a bridge; wherein the wireless device is configured to communicate with a cloud server via a wired connection; wherein the mobile device and the reader device communicate wirelessly via Bluetooth.

Another aspect of the present application may include a method, comprising: personalizing a user interface configuration; transmitting the user interface configuration from a mobile device to a reader device; implementing the user interface configuration in the reader device; and performing via the reader device a function based upon the personalized user interface configuration.

Features of the aspect of the present application may include: determining via a cloud server whether to allow or disallow user interface configuration options based on a policy, wherein the mobile device is further configured to wirelessly communicate with the cloud server to receive at least one of the user interface configuration options and the policy; wherein the policy is based upon at least one of the identity of the mobile device and the identity of the reader device; wherein the policy is pushed to the mobile device; wirelessly transmitting configuration information from a wireless device to at least one of the mobile device and the reader device via Bluetooth; wherein the wireless device is at least one of a fob, a computer, a reader and a bridge; wherein the wireless device is configured to communicate with a cloud server via a wired connection; wherein the mobile device and the reader device communicate wirelessly via Bluetooth.

Yet another aspect of the present application may include an apparatus, comprising: a mobile device configured to personalize a user interface configuration stored on a cloud server, download the user interface configuration from the cloud server, transmit the user interface configuration to a reader device, and interact with the reader device to utilize the user interface configuration.

Features of the aspect of the present application may include: wherein the mobile device and the reader device communicate wirelessly via Bluetooth; wherein the mobile device is further configured to receive a policy from the cloud server via a pushed message.

Another aspect of the present application may include a method, comprising establishing wireless communication between a mobile device and a reader device; transmitting a reader device identification from the reader device to the mobile device; transmitting the reader device identification and a mobile device identification from the mobile device to a server; determining via the server whether the mobile device is permitted access to the reader device based at least



in part on the reader device identification and the mobile device identification; transmitting a grant/deny message from the server to the mobile device based upon the determining; and transmitting the grant/deny message from the mobile device to the reader device.

Features of the aspect of the present application may include: transmitting via the reader device an advertisement indicating a presence of the reader device to the mobile device; scanning via the mobile device for the advertisement; and wherein the establishing is performed by the reader device receiving a response to the advertisement from the mobile device; wherein the transmitting is performed while the reader device is in a low power sleep state; wherein the scanning is performed when the mobile device is in a low power scan mode; requesting via the server additional credential information from the mobile device; transmitting the additional credential information from the mobile device to the server; and wherein the determining is further based upon the additional credential information; further comprising inputting the additional credential information into the mobile device in response to the requesting; wherein the additional credential information includes data relating to at least one of a pin code, a passphrase, a gesture with the mobile device, facial recognition, and voice recognition; further comprising encrypting at least one of the reader device identification and the grant/deny message; wherein the reader device comprises an electronic lock.

Yet another aspect of the present application may include a system, comprising: a reader device; and a mobile device in communication with a server and in wireless communication with the reader device; and wherein the reader device has a reader device identification and is configured to transmit the reader device identification wirelessly to the mobile device; wherein the mobile device includes a mobile device identification and is configured to transmit the reader device identification and the mobile device identification to the server; wherein the server is configured to make a determination in real-time whether the mobile device is permitted access to the reader device based at least in part on the reader device identification and the mobile device identification, the server further configured to transmit a grant/deny message to the mobile device based on the determination; and wherein the mobile device is configured to transmit the grant/deny message to the reader device.

Features of the aspect of the present application may include: wherein the server comprises a cloud server; wherein at least one of the reader device identification and the grant/deny message is encrypted; wherein the mobile device comprises a smartphone; wherein the reader device comprises an electronic lock; wherein the reader device includes a low power sleep state; and wherein the reader device is configured to advertise its presence to the mobile device while in the low power sleep state; wherein the mobile device is configured to scan for one or more of the reader devices in wireless communication range and to initiate wireless communication with the one or more of the reader devices that are determined to be in wireless communication range; wherein the server is configured to transmit a message to the mobile device indicative of a requirement for additional credential information; and wherein a user of the mobile device is prompted to input the additional credential information into the mobile device.

Another aspect of the present application may include an apparatus, comprising: a mobile device configured to receive a reader device identification from a reader device via Bluetooth communication, transmit a mobile device identification and the reader device identification to a server

via the Internet, receive a grant/deny message from the server, and transmit the grant/deny message to the reader device.

Features of the aspect of the present application may include: wherein the mobile device is further configured to receive a request from the server for additional credential information, receive a user input that includes additional credential information, and transmit the additional credential information to the server; wherein the additional credential information includes data relating to at least one of a pin code, a passphrase, a gesture with the mobile device, facial recognition, and voice recognition.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiments have been shown and described and that all changes and modifications that conic within the spirit of the inventions are desired to be protected.

It should be understood that while the use of words such as preferable, preferably, preferred or more preferred utilized in the description above indicate that the feature so described may be more desirable, it nonetheless may not be necessary and embodiments lacking the same may be contemplated as within the scope of the invention, the scope being defined by the claims that follow. In reading the claims, it is intended that when words such as “a,” “an,” “at least one,” or “at least one portion” are used there is no intention to limit the claim to only one item unless specifically stated to the contrary in the claim. When the language “at least a portion” and/or “a portion” is used the item can include a portion and/or the entire item unless specifically stated to the contrary.

What is claimed is:

1. A method, comprising:

establishing wireless communication between a mobile device and a reader device;  
transmitting a reader device identification from the reader device to the mobile device;  
transmitting the reader device identification and a mobile device identification from the mobile device to a server;  
determining via the server whether the mobile device is permitted access to the reader device based at least in part on the reader device identification and the mobile device identification;  
transmitting a grant/deny message from the server to the mobile device based upon the determining;  
transmitting the grant/deny message from the mobile device to the reader device; and  
generating, on a mobile device, a personalized user interface configuration of the reader device in response to selections made by a user on the mobile device and based on at least one dynamically set individual user policy pushed from the server to the mobile device;  
wherein the personalized user interface configuration of the reader device affects the user’s interaction with the reader device such that the user has an experience different from an experience associated with configuration characteristics of a population-wide user interface configuration.

2. The method of claim 1, further comprising:

transmitting via the reader device an advertisement indicating a presence of the reader device to the mobile device;  
scanning via the mobile device for the advertisement; and



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wherein the establishing is performed by the reader device receiving a response to the advertisement from the mobile device.

3. The method of claim 2, wherein the transmitting is performed while the reader device is in a low power sleep state.

4. The method of claim 2, wherein the scanning is performed when the mobile device is in a low power scan mode.

5. The method of claim 1, further comprising:  
requesting via the server additional credential information from the mobile device;  
transmitting the additional credential information from the mobile device to the server; and  
wherein the determining is further based upon the additional credential information.

6. The method of claim 5, further comprising inputting the additional credential information into the mobile device in response to the requesting; and  
wherein the additional credential information includes data relating to at least one of a pin code, a passphrase, a gesture with the mobile device, facial recognition, and voice recognition.

7. The method of claim 1, further comprising encrypting at least one of the reader device identification and the grant/deny message.

8. The method of claim 1, wherein each policy of the at least one dynamically set individual user policy is unique to at least one of a user of a corresponding mobile device or a corresponding reader device.

9. The method of claim 1, further comprising implementing a cache mode on the reader device in which the at least one dynamically set individual user policy is pushed from the server to the mobile device and from the mobile device to the reader device.

10. A system, comprising:

a reader device; and

a mobile device in communication with a server and in wireless communication with the reader device;

wherein the reader device has a reader device identification and is configured to transmit the reader device identification wirelessly to the mobile device;

wherein the mobile device includes a mobile device identification and is configured to transmit the reader device identification and the mobile device identification to the server;

wherein the server is configured to make a determination in real-time whether the mobile device is permitted access to the reader device based at least in part on the reader device identification and the mobile device identification, the server further configured to transmit a grant/deny message to the mobile device based on the determination;

wherein the mobile device is configured to transmit the grant/deny message to the reader device;

wherein the mobile device is configured to generate a personalized user interface configuration of the reader device in response to selections made by a user on the mobile device and based on at least one dynamically set individual user policy pushed from the server to the mobile device; and

wherein the personalized user interface configuration of the reader device affects the user's interaction with the reader device such that the user has an experience

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different from an experience associated with configuration characteristics of a population-wide user interface configuration.

11. The system of claim 10, wherein the server comprises a cloud server;

wherein the reader device comprises an electronic lock; and

wherein the mobile device comprises a smartphone.

12. The system of claim 10, wherein at least one of the reader device identification and the grant/deny message is encrypted.

13. The system of claim 10, wherein the reader device includes a low power sleep state; and

wherein the reader device is configured to advertise its presence to the mobile device while in the low power sleep state.

14. The system of claim 10, wherein the mobile device is configured to scan for one or more of the reader devices in wireless communication range and to initiate wireless communication with the one or more of the reader devices that are determined to be in wireless communication range.

15. The system of claim 10, wherein the server is configured to transmit a message to the mobile device indicative of a requirement for additional credential information; and  
wherein the user of the mobile device is prompted to input the additional credential information into the mobile device.

16. The system of claim 10, wherein each policy of the at least one dynamically set individual user policy is unique to at least one of a user of a corresponding mobile device or a corresponding reader device.

17. The system of claim 10, wherein the server is configured to implement a cache mode on the reader device in which the at least one dynamically set individual user policy is pushed from the server to the mobile device and from the mobile device to the reader device.

18. The system of claim 10, wherein the mobile device determines when to send information to the reader device in order to optimize data transfer to the reader device.

19. The system of claim 10, wherein the mobile device is configured to generate the personalized user interface configuration of the reader device based on user selections to modify the at least one dynamically set individual user policy pushed from the server to the mobile device; and

wherein the mobile device is further configured to transmit the personalized user interface configuration to the reader device for implementation thereon.

20. A method, comprising:

implementing a cache mode in which at least one dynamically set individual user policy is pushed from a server to a mobile device and from the mobile device to the reader device;

receiving, by the mobile device, the at least one dynamically set individual user policy pushed from the server to the mobile device; and

generating, by the mobile device, a personalized user interface configuration for the reader device in response to selections made by a user on the mobile device and based on the at least one dynamically set individual user policy;

wherein the personalized user interface configuration affects the user's interaction with the reader device such that the user has an experience different from an experience associated with configuration characteristics of a population-wide user interface configuration.